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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/530,428	04/05/2005	Marc Bednarz	P/4600-10	5771

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EXAMINER	
ONEILL, KARIE AMBER	
ART UNIT	**PAPER NUMBER**
1795	
MAIL DATE	**DELIVERY MODE**
02/27/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/530,428	BEDNARZ ET AL.	
	Examiner	Art Unit	
	Karie O'Neill	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4-5-05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-17 have been cancelled. Claims 18-37 have been added as new. Therefore, Claims 18-37 are pending in this office action.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) or (f), which papers have been placed of record in the file.

Information Disclosure Statement

3. Information disclosure statement (IDS), submitted April 5, 2005, has been received and considered by the examiner.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 18, 20-27 and 29-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedrich (WO 02/41423 A2) using Friedrich (US 2004/0062981 A1) as an English translation.

With regard to Claims 18 and 27, Friedrich discloses an electrolyte matrix and method for producing an electrolyte matrix for a molten carbonate fuel cell which

comprises lithium carbonate, aluminum oxide and a carbide (paragraph 0039), in the green state (paragraph 0027). Friedrich discloses the carbide as being zirconium carbide. Friedrich does not wherein the carbide is titanium carbide. However, it would have been obvious to one of ordinary skill in the art to use titanium carbide in the electrolyte matrix of Friedrich, because zirconium and titanium both belong to group 4 of the periodic table and they are hard refractory metals with low aqueous solubility and low availability to the biosphere. Therefore, it would be obvious to use one of the group 4 elements as an alternate for another; i.e. use titanium in substitution for zirconium.

With regard to Claims 20-21 and 29-30, Friedrich discloses wherein the matrix material additionally contains nanoscale secondary particles, wherein the nanoscale secondary particles are at least one material of the group consisting of ZrO_2, SiO_2, Al_2O_3 and TiO_2 (paragraph 0039).

With regard to Claims 22 and 35-37, Friedrich discloses wherein the matrix material is incorporated in the "green state" into a molten carbonate fuel cell and is composed to undergo synthesis when the fuel cell is started (paragraph 0027), accompanied by an increase in volume (paragraph 0007), and contains lithium aluminate and lithium zirconate (paragraph 0027). Friedrich does not disclose wherein lithium titanate is formed during startup of the fuel cell. However, if titanium was used as an alternate to zirconium, as discussed above, the chemical reaction of lithium carbonate and titanium carbide would form lithium titanate, as it forms zirconium titanate when lithium carbonate and zirconium carbide are reacted. Therefore, it would have been obvious to use titanium carbide in the matrix electrolyte of Friedrich, because

zirconium and titanium both belong to group 4 of the periodic table and they are hard refractory metals with low aqueous solubility and low availability to the biosphere.

With regard to Claims 23-24, Friedrich discloses wherein after the fuel cell has been started up, the electrolyte matrix has an open porosity of 30 to 70%, more preferably of 40 to 60 % (paragraph 0032).

With regard to Claims 25-26, Friedrich discloses the electrolyte matrix having an increase in volume when the fuel cell is started up. Friedrich does not disclose wherein the volume increase is 2.5 -5%, more preferably 3-4%. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use materials which would provide a volume increase of 2.5 to 5%, because due to an increase in volume of the electrolyte matrix, there is an increase in the contacting pressure between the electrolyte matrix and the electrodes, as well as their current collectors, which leads to a higher cell output, and since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *See MPEP 2144.*

With regard to Claims 31 and 34, Friedrich discloses mixing the matrix material in finely powdered form with a dispersion medium/solvent to form a matrix slurry, which is then shaped and dried (paragraphs 0039-0040), wherein shaping the matrix slurry includes casting, rolling, spraying or application by doctor blade (paragraph 0041).

With regard to Claims 32-33, Friedrich discloses mixing the lithium compound, aluminum oxide and carbide with water and/or organic acid, followed by the steps of ball milling, homogenizing in a reactor and then molding and drying. Because the step of

drying occurs to the matrix slurry, it would be obvious that the solids content of the matrix slurry would be at least 50%. When something is dried, the liquid is removed and the slurry becomes solid.

6. Claims 19 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friedrich (WO 02/41423 A2) using Friedrich (US 2004/0062981 A1) as an English translation, as applied to Claims 18, 20-27 and 29-37, and in further view of Sim et al. (US 4,251,600).

Friedrich discloses an electrolyte matrix and method for producing an electrolyte matrix for a molten carbonate fuel cell, but do not disclose wherein the matrix electrolyte material additionally contains aluminum hydroxide.

Sim et al. discloses a molten electrolyte within a fuel cell containing a slurry of aluminum hydroxide and lithium hydroxide. The slurry is dewatered and dried, causing a portion of the mixture to react and form dehydrated lithium aluminate. Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to use aluminum hydroxide as part of the electrolyte matrix of Friedrich, because Sim et al. teaches aluminum hydroxide being of a fine particle size and aiding in the step of agglomeration of particles (column 2lines 1-3 and column 3 lines 11-13)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571)272-

8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill
Examiner
Art Unit 1795

KAO

/PATRICK RYAN/

Supervisory Patent Examiner, Art Unit 1795